



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/634,667	08/05/2003	Katherina Babich	YOR920030174US1	7152

7590 02/06/2006

Ryan, Mason & Lewis, LLP
Suite 205
1300 Post Road
Fairfield, CT 06824

EXAMINER

WALKE, AMANDA C

ART UNIT	PAPER NUMBER
----------	--------------

1752

DATE MAILED: 02/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/634,667

Applicant(s)

BABICH ET AL.

Examiner

Amanda C. Walke

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

In light of Applicant's arguments, the rejection made in the previous office action has been dropped and a new rejection follows.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kennedy et al (6,506, 497) in view of Bening (2005/0107541) and Feder et al (6,521,699).

Kennedy et al disclose anti-reflective coating materials for deep ultraviolet photolithography include one or more organic light-absorbing compounds incorporated into spin-on-glass materials. Suitable absorbing compounds are strongly absorbing over wavelength ranges around wavelengths such as 365 nm, 248 nm, and 193 nm that may be used in photolithography. A method of making absorbing spin-on-glass materials includes combining one or more organic absorbing compounds with alkoxysilane or halosilane reactants during synthesis of the spin-on-glass materials.

An anti-reflective coating material for deep ultraviolet photolithography includes one or more organic absorbing compounds incorporated into a spin-on-glass (SOG) material. The spin-on-glass materials include methylsiloxane, methylsilsesquioxane, phenylsiloxane, phenylsilsesquioxane, methylphenylsiloxane, methylphenylsilsesquioxane, and silicate polymers. As used herein, spin-on-glass materials also include hydrogensiloxane polymers of the general

Art Unit: 1752

formula $(H_{0-1.0} SiO_{1.5-2.0})_x$ and hydrogensilsesquioxane polymers, which have the formula $(HsiO_{1.5})_x$, where x is greater than about 8. Also included are copolymers of hydrogensilsesquioxane and alkoxyhydridosiloxane or hydroxyhydridosiloxane. Spin-on-glass materials additionally include organohydridosiloxane polymers of the general formula $(H_{0-1.0} SiO_{1.5-2.0})_n (R_{0-1.0} SiO_{1.5-2.0})_m$, and organohydridosilsesquioxane polymers of the general formula $(HsiO_{1.5})_{sub.n} (RSiO_{1.5})_{sub.m}$, where m is greater than 0 and the sum of n and m is greater than about 8 and R is alkyl or aryl. Coating solutions of spin-on-glass materials incorporating absorbing compounds are used to form anti-reflecting films on various layers in integrated circuit devices. Absorbing compounds suitable for use with the present invention are strongly absorbing at wavelengths less than about 375 nm or less than about 260 nm. In particular, suitable absorbing compounds are strongly absorbing over at least an approximately 10 nm wide wavelength range around wavelengths such as 248 nm, 193 nm, or other ultraviolet wavelengths, such as 365 nm, that may be used in photolithography. The chromophores of suitable compounds typically have from one to three benzene rings that may or may not be fused. Incorporatable absorbing compounds have an accessible reactive group attached to the chromophore, the reactive groups including hydroxyl groups, amine groups, carboxylic acid groups, and substituted silyl groups with silicon bonded to one, two, or three alkoxy group or halogen atom substituents. The reactive groups may be directly bonded to the chromophore or the reactive groups may be attached to the chromophore through a hydrocarbon bridge.

Examples of suitable organic absorbing compounds include anthraflavic acid, 9-anthracene carboxylic acid, 9-anthracene methanol, alizarin, quinizarin, primuline, 2-hydroxy-4(3-triethoxysilylpropoxy)-diphenylketone, rosolic acid, triethoxysilylpropyl-1,8-naphthalimide,

Art Unit: 1752

9-anthracene carboxy-methyl triethoxysilane, phenyltriethoxysilane, azo compounds, such as 4-phenylazophenol, and mixtures thereof.

The reference teaches that conventional additives may be included in the layer, but fails to specifically mention a cross-linking agent, and while provides examples of silsesquioxane compounds, fails to disclose a specific compound meeting the instant claim limitations.

Bening disclose 3D polyhedral oligosilsesquioxane polymers that aid in crosslinking. The POSS polymers taught by the reference appear to meet the instant claim limitations, as the polymer has the same formula, and n is preferably 8 [0028].

Given the teachings of the references, it would have been obvious to one of ordinary skill in the art to prepare the material of Kennedy et al choosing to employ the silsesquioxane polymer to aid cross-linking taught by Bening with reasonable expectation of achieving a material able to form a pattern having small features.

Feder et al disclose a layer similar to that of Kennedy et al. The reference teaches that polysilsesquioxane compositions conventionally comprise cross-linking agents (see abstract).

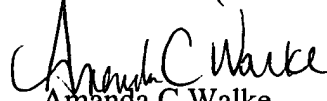
Given the teachings of the references, it would have been obvious to one of ordinary skill in the art to prepare the material of Kennedy et al in view of Bening choosing to employ a cross-linking agent with reasonable expectation of achieving a material able to form a pattern having small features.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amanda C. Walke whose telephone number is 571-272-1337. The examiner can normally be reached on M-R 5:30-4.

Art Unit: 1752

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Amanda C Walke
Examiner
Art Unit 1752

ACW
February 3, 2006